A newly recognized subspecies of *Danaus* Kluk; *Danaus cleophile jamaicensis* (Nymphalidae: Danainae) from Jamaica, West Indies

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Abstract: Previous authors identified morphological differences between the populations of *Danaus cleophile* Godart from Jamaica and Hispaniola. The Jamaican subspecies is smaller, darker in coloration, and has several slight but consistent wing pattern characters, and it is here described and named as *Danaus cleophile jamaicensis* Turner and Turland, **n. ssp**.

Key words: Caribbean, Hispaniola, Jamaica, Danainae, subspecies, *cleophile*.

INTRODUCTION

Danaus cleophile (Godart, 1819) is known only from Hispaniola and Jamaica. There is a single record from Puerto Rico as noted by Wolcott (1936), but this has never been verified by the finding of another specimen. Initially, the type locality was not clearly defined, but Brown and Heineman (1972) concluded that Haiti was most probably the origin of Godart's first specimens. This conclusion was followed by Riley (1975) and Smith *et al.* (1994); Godart's (1819) specimen, formerly considered to be the holotype has subsequently been regarded as a syntype, since Godart did not designate a type locality. Two syntypes deposited in the Muséum National d'Histoire Naturelle, Paris, France (MNHN), photographed by G. Lamas (in Warren *et al.*, 2016), exhibit features typical of the Hispaniolan population that uniformly differs from all specimens known from Jamaica. In comparing the two populations, Brown and Heineman (1972: 92) noted that Jamaican specimens are "noticeably smaller, especially the males; the ground color is somewhat darker; the cell on the upper side of the forewing is usually wholly black, while *D. cleophile cleophile* bears an angled brown line at the junction of the lower disco cellular and M3 veins; the black marking along the veins on the hind wing is heavier when compared with specimens from Hispaniola, and the inner row of white spots in the black margin on the underside of the hind wings is less prominent." Schwartz (1989: 468) stated "it remains for someone to secure a series of Jamaican specimens with exact locality data to verify the differences between the 2 [sic] populations and to apply a name to the Jamaican subspecies."

Danaus cleophile jamaicensis Turner and Turland ssp. nov.

Description. Holotype male: (Fig. 1a, b) *Dorsal forewing*: Dull orange-brown, with black veins, a black apex and broad black outer margin; hind margin brown, suffused with black scales; base of costa, gray. Between costa and subcosta, a single, median, pale yellow dash; two pale yellow dashes above end of cell followed by a post-discal pair, and a single pale yellow dash near apex. Last dash joins an inner row of ten pale yellow spots and a similar outer row of eleven spots along outer margin, both rows meeting at a single spot at tornus. Below the costa two large post-discal spots, three sub-apical spots, and a single sub-marginal spot between M2-M3.

Dorsal hind wing: Dull orange-brown crossed by black veins. A black androconial patch beside vein Cu2 distad of cell. Anterior margin narrowly black with a large pale yellow spot towards anterior outer margin; outer margin broadly black enclosing a row of fourteen marginal spots extending to vein 2A, anterior spots minute; inner row discontinuous, with one faint anterior spot and three small spots near tornus; other spots of inner row marked by a few brown scales.

Dorsal head: Dorsal head, thorax, and abdomen black with two white spots on head between antennae, and a series of four, minute, ill-defined spots behind antennae; antennae black, both broken along shaft, without clubs. There are two pairs of larger yellowish spots on the thorax, and two tiny pale spots at base of each forewing. Two ill-defined spots at base of each hind wing, and a very thin discontinuous white mid-thoracic line. Two pairs of yellowish spots at anterior of black abdomen; abdomen enlarged terminally; marked with white inter-segmental bands. Ventral head, black, with four distinct white spots. Thorax with multiple rows of white spots; four to each segment; paired white spots at each wing-base. Abdomen dark brown with two broad lateral stripes and a discontinuous yellowish stripe of four dashes mid-ventrally; spiracles outlined in white.

Ventral forewing: With most of cell and cells between vein M3 and hind margin orange-brown; costa, apex, and outer margin black; pale yellow spots of dorsum repeated. A dark gray-brown sub-apical bar isolates two orange-brown cells between veins R5-M2; wing-veins are outlined with dark brown scales; hind margin, narrowly black.

Ventral hind wing: Light brown with veins boldly outlined in dark brown scales; individual veins bordered by a broad frosting of white scales which is absent from centers of each cell, ground color here creating lighter brown darts. There is a brown ellipse flanked by buff-white scales between veins Sc+R1 and RS above the discal cell; two smaller spots near anterior margin, one basad, other distad of elliptical spot. Black outer margin enclosing a double row of pale yellow spots, comprised of an inner row with one small anterior and five small additional spots towards tornus with traces of five additional spots between.

Female paratype: (Fig. 1c, d) Similar in size and markings to the male but lacking the androconial patch on the dorsal hind wing. Both wings with darker dusky orange-brown ground color. Both antennae are intact, just less than half the length of the forewing, with slightly enlarged clubs.

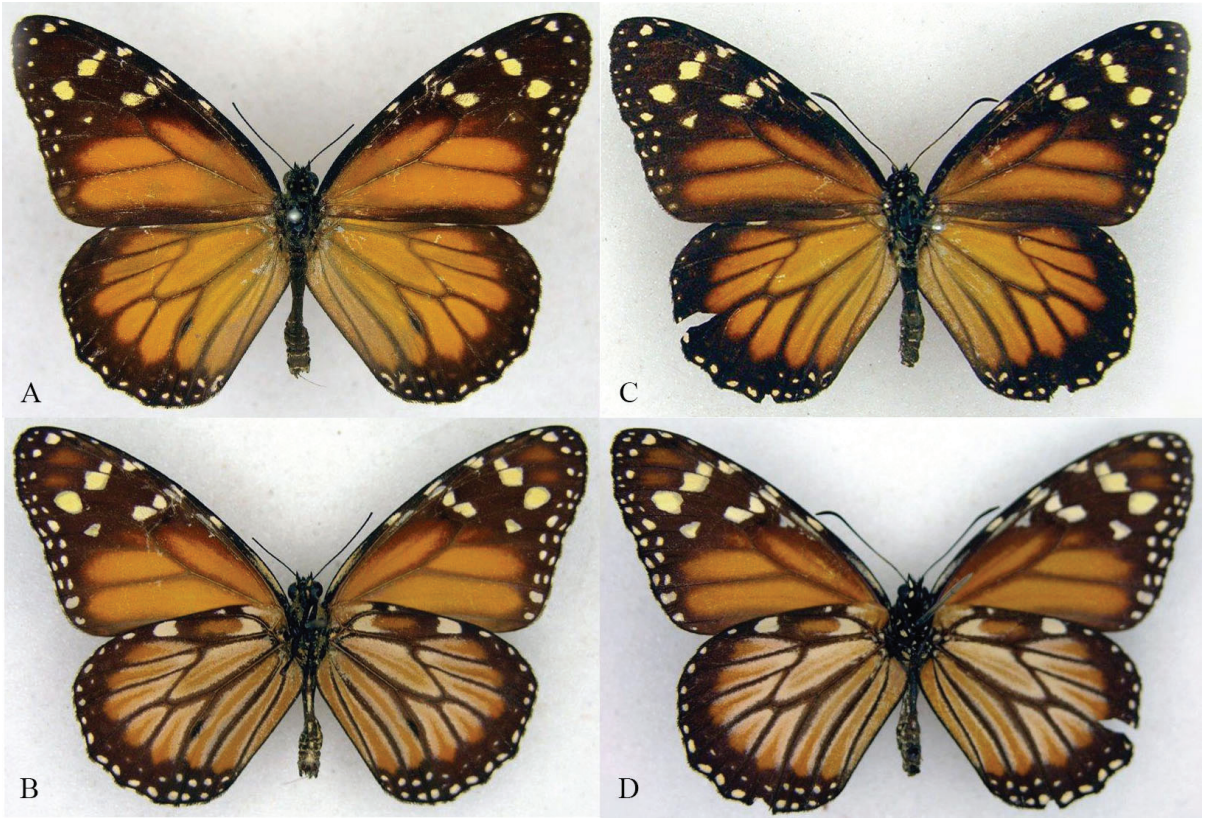

Fig. 1. *Danaus cleophile jamaicensis.* **A**. Male holotype dorsal, **B**. Male holotype ventral (photos © Trustees Natural History Museum). **C.** Female paratype dorsal, **D**. Female paratype ventral (photos courtesy IJ, NHMJ).

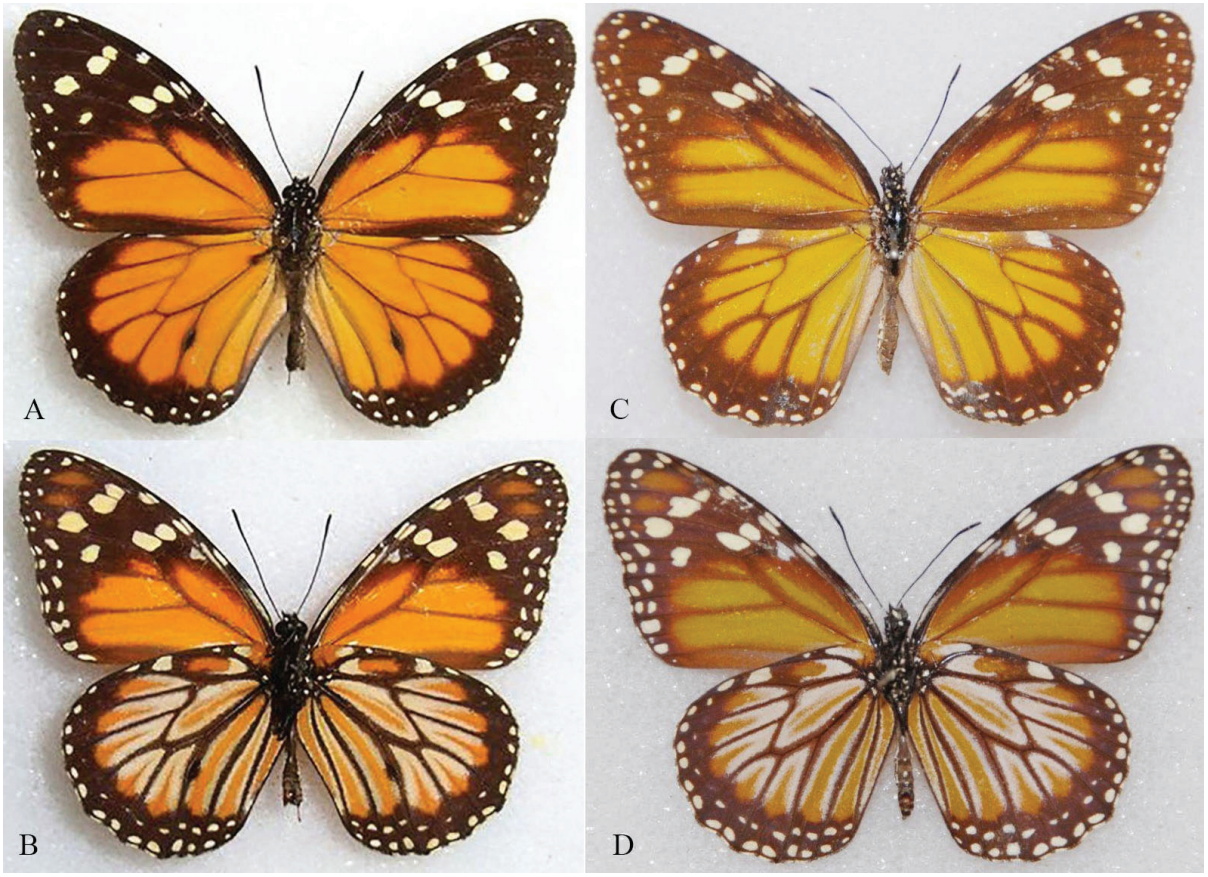

Fig. 2. *Danaus cleophile cleophile*, Constanza, La Vega, Dominican Republic, Jun., 1994. **A.** Male dorsal, **B.** Male ventral, **C**. Female dorsal, **D**. Female ventral.

Diagnosis: The characteristics distinguishing *D. c. jamaicensis* **n. ssp.** are:

1. Smaller forewing size. Average length of male forewing 31.6 mm (n=7); average length of female forewing 31.7 mm (n=5). Average wingspan, as measured from wing-tip to wing-tip with the hind forewing margin at right angles to the axis of the head-thorax-abdomen, for both sexes was 54.6 mm (n=16).

Wing size for Hispaniolan material is: average length of male forewing 34.8 mm (n=10); average length of female forewing 32.8 mm (n=6). Average wingspan for both sexes 56.4 mm (n=16). The forewings of Hispaniolan specimens are more fully rounded and less elongated than the narrower forewings of the Jamaican insect. Measurements using a mm grid indicate that the forewings of Jamaican specimens (n=19) are 5-7 percent smaller in surface area than those from Hispaniola.

2. Darker ground color. Jamaican specimens have a darker dull-brown ground color when compared with the lighter orange-brown of specimens from Hispaniola. Schwartz (1989) wondered if this difference, as depicted in Brown and Heineman (1972, Pl. I, #3), was accurate or an 'artistic artifact'. We confirm here that Brown and Heineman's (1972) illustration is an accurate representation. Schwartz was only able to examine illustrations, rather than specimens, of Jamaican material.

3. Spot size at forewing apex. The first three spots of the inner row of marginal spots at the forewing apex are larger in the Jamaican subspecies when compared with Hispaniolan specimens. These are best expressed on the ventral surface. This is a minor but consistent feature.

4. Brown marking at base of cell between veins M3 and Cu1 of the forewing. This marking lies just beyond the discal cell and is most evident ventrally. Brown color occupies approximately one fifth of the cell-base in specimens from Hispaniola, but only one tenth of the cell-base in Jamaican specimens, although this marking in specimens from both islands is sometimes occluded by black scales. This may really be a function of differences in wing size between the subspecies.

Though these differences are small, *D. c. jamaicensis* are very uniform in appearance and can be readily distinguished from the nominotypical subspecies from Hispaniola.

Type specimens. Holotype male with labels attached as follows: White label attached "Jamaica/ Purch. from/ Gosse/ 45 – 110."; blue label "cleophile/ Godart". Deposited in the Natural History Museum, London, UK.
Paratype female with three faded white labels attached "Danais cleophile/ Godart/ Mt. Diabolo/10 VII/ Presented by Carnegie Mus. 1941". Deposited in the Institute of Jamaica, Natural History Museum of Jamaica, Kingston, Jamaica.

DISCUSSION

In both sexes of *D. c. jamaicensis*, all the dorsal wing spots are pale yellow, as also stated by Riley (1975), but may appear close to white in worn specimens. In the Hispaniolan subspecies these pale yellow spots also appear white on older specimens, in bright sunlight, or in photographs taken when using flash photography.

During examination of *D. c. jamaicensis* at the Carnegie Museum of Natural History (CMNH), Pittsburgh, the Natural History Museum (NHMUK), London, the McGuire Center for Lepidoptera and Biodiversity (Florida Museum of Natural History, MGCL) and the Institute of Jamaica, Natural History Museum of Jamaica (IJ, NHMJ), along with comparative material of *D. c. cleophile* from the Dominican Republic, we did not find the cell of the upper forewing to be wholly black as stated by Brown and Heineman (1972). The forewing cell is basally brown and distally black. In specimens from both islands, the cell may be between one third and two thirds black towards the costa, but never completely black, as also noted by Schwartz (1989).

The inner row of "white spots" in the black margin on the underside of the hind wings is variably defined in specimens from both island populations. It is reduced in some and better developed in others. Usually the inner row of spots on the ventral hind wing of Hispaniolan specimens is better developed, with up to ten small spots in the male and as many as thirteen in the female.

There are no recent records of this species in Jamaica. The series of specimens examined comprises nine specimens of *D. cleophile jamaicensis* from Jamaica at the NHMUK, London, including the holotype male and two females purchased from Philip Henry Gosse. No additional data is attached and it is not known how Gosse obtained them, but he was in Jamaica between 1844 and 1846 (Gosse, 1851). The earliest specimen of *D. cleophile jamaicensis* with partial collection data is a female at the NHMUK dated 1873 and attributed to R. V. Sherring. Another three males without dates of capture were collected by F. D. Godman and O. Salvin at Moneague in northern Jamaica. Avinoff and Shoumatoff (1946) state that these were collected *circa* 1896. Two males and two females were collected by Andrey Avinoff on July 9, 1936. One male is deposited at the NHMUK, along with other specimens lacking full collection data. The second male and two females were deposited at CMNH. Nicholas Shoumatoff (pers. comm.) advised that the female paratype from "Mount Diabolo" [sic] with a label dated July 1941, and donated to the IJ, NHMJ, Kingston, by CMNH, was actually collected on July 10th 1940.

Fig. 3. Distribution map, *Danaus cleophile jamaicensis*.

Specimens of *D. cleophile cleophile* examined at the NHMUK include two males collected by Godman and Salvin in Haiti; four males and one female collected by A. Hall on Mt. Isabella, Santo Domingo, and another female at La Cumbre, Dominican Republic, in June 1923. Two females are from Port-au-Prince, Haiti, from the Charles Oberthür collection and one female is from Haiti from the James J. Joicy Bequest. No other data is attached. Additional specimens were examined at the MGCL, including one female (Fig.2 c, d) collected by A. Hall on Mt. Isabella, Santo Domingo at 305 m (1000 ft) in June 1923, two specimens collected at Las Abejas, D. R. Pedernales, Dominican Republic, at 823 m (2700 ft) on June 14, 1986 by

F. González, and four males and a female collected in 1994 at Constanza, la Vega Province, Dominican Republic, at an elevation of 1250 m (4100ft) in the Turner collection.

Type locality. The holotype has no distribution data more precise than 'Jamaica'. However, no specimens are known to have been collected in Jamaica other than from Mt. Diablo. Nicholas Shoumatoff (pers. comm.), referring to himself and Avinoff, described the locality where they encountered this taxon as follows: "Our specimens were all taken (in 1940, not 1941) on a single, fairly level, approximately one-acre patch of open, tall grass, about one or two miles north of Hollymount, along the east side of the southbound road that rises to Hollymount." This site is a few kilometers south of the nearest town of Moneague, St. Ann Parish. Godman and Salvin named Moneague as the location where specimens of *D. cleophile* were collected *circa* 1896.

Etymology. *Danaus cleophile jamaicensis* **n. ssp.** is endemic to the island of Jamaica, for which it is named.

English name. Schwartz (1989) regretted Riley's (1975) English name for *D. cleophile* as the "Jamaican Monarch", presumably because the type locality is Haiti. The English name used by Warren *et al*. (2015) is "Caribbean Queen", but the name "Queen" also applies to other species of Danainae, leading to possible confusion. It is proposed that for *D. c. jamaicensis* the English name Jamaican Lesser Monarch be applied, and that *D. c. cleophile* be recognized as the Hispaniolan Lesser Monarch.

Distribution and phenology. (Fig. 3) Avinoff and Shoumatoff (1946), and Avinoff's notes referred to by Brown and Heineman (1972), record the site where they collected *D. cleophile* as Mt. Diablo, a few kilometers south of Moneague, St. Ann Parish, Jamaica, at an elevation of about 610 m (2000 ft) where it was uncommon with less than ten specimens seen in a day. While conducting repeated searches on Mount Diablo beginning in 1990, the first author was unable to locate any waterfalls as described from Avinoff's and Shoumatoff's notes, and as reported in Brown and Heineman (1972). Nicholas Shoumatoff was contacted and he advised that this habitat description was incorrect. He rectified this in a technical comment (Shoumatoff 1993). Later in 1993, with this new information, it was possible to relocate the probable collecting site on a stony, open, south-facing slope on the east side of the old road to Hollymount now planted with pines (*Pinus* species). Plants of the orange-flowered *Asclepias curassavica* L., the white-flowering *A. nivea* L., and yellow-orange hybrid intermediates were present. Larvae of *Danaus gilippus jamaicensis* H. W. Bates (Jamaican Queen), from which tachinid fly parasites subsequently emerged, were collected. Clearings in nearby hardwood forest were also searched, but no adults of *D. c. jamaicensis* **n. ssp.** were found.

Searches for this subspecies, (Turner and Turland, 2017), so far without success, have continued at higher elevations where *A. nivea*, a larval foodplant recorded by Sourakov (2008) in the Dominican Republic, grows. This search area has also been extended to include nearby Bullhead Mountain (850 m; 2782 ft) in Clarendon parish. The last known specimens were those collected by Avinoff and Shoumatoff in 1940, more than seventy years ago. However, there have been other instances, where after similar extended periods of apparent absence, Jamaican butterfly species have subsequently been rediscovered. For example, *Grais juncta* Evans was rediscovered by us in the Cockpit Country of west central Jamaica in 2009 after an absence of seventy-five years.

The distribution record for Kingston in adjacent St. Andrew Parish as given in Brown and Heineman (1972) is unsubstantiated, and their suggestion that Panton reared *D. cleophile* from larvae in Clarendon parish is also discounted, with these larvae instead belonging to a small native subspecies of *D. plexippus* found in the northern Caribbean.

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